ISO/IEC 15504-10 Safety Extension, Yet Another Safety Standard ?

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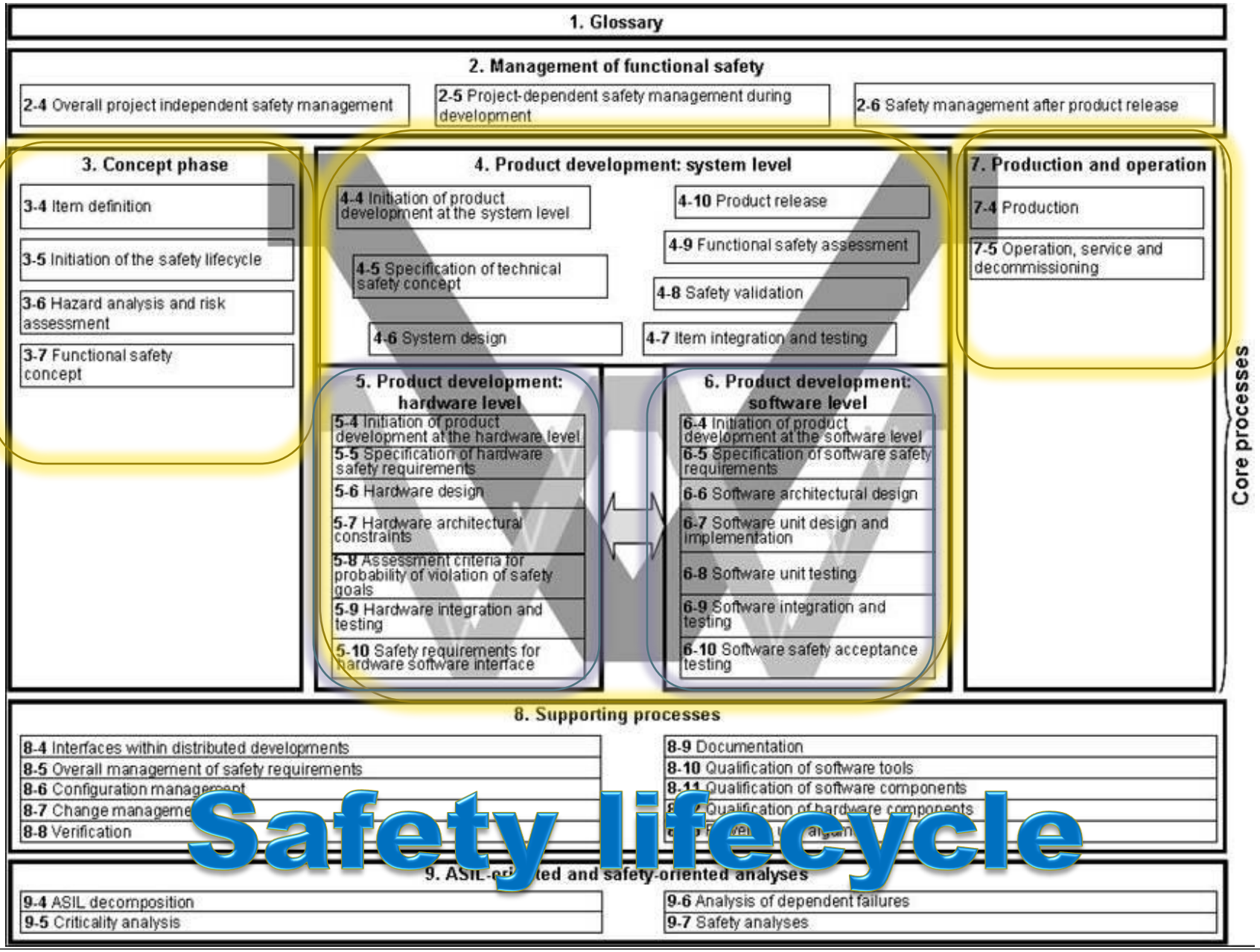
Talk outline

- Relationship between ISO 26262 & Automotive SPICE
- Overview of the last release of ISO/IEC 15504-10 Safety Extension (DTR ballot)
- How to integrate ISO 26262 & ISO/IEC 15504-10
- Conclusions

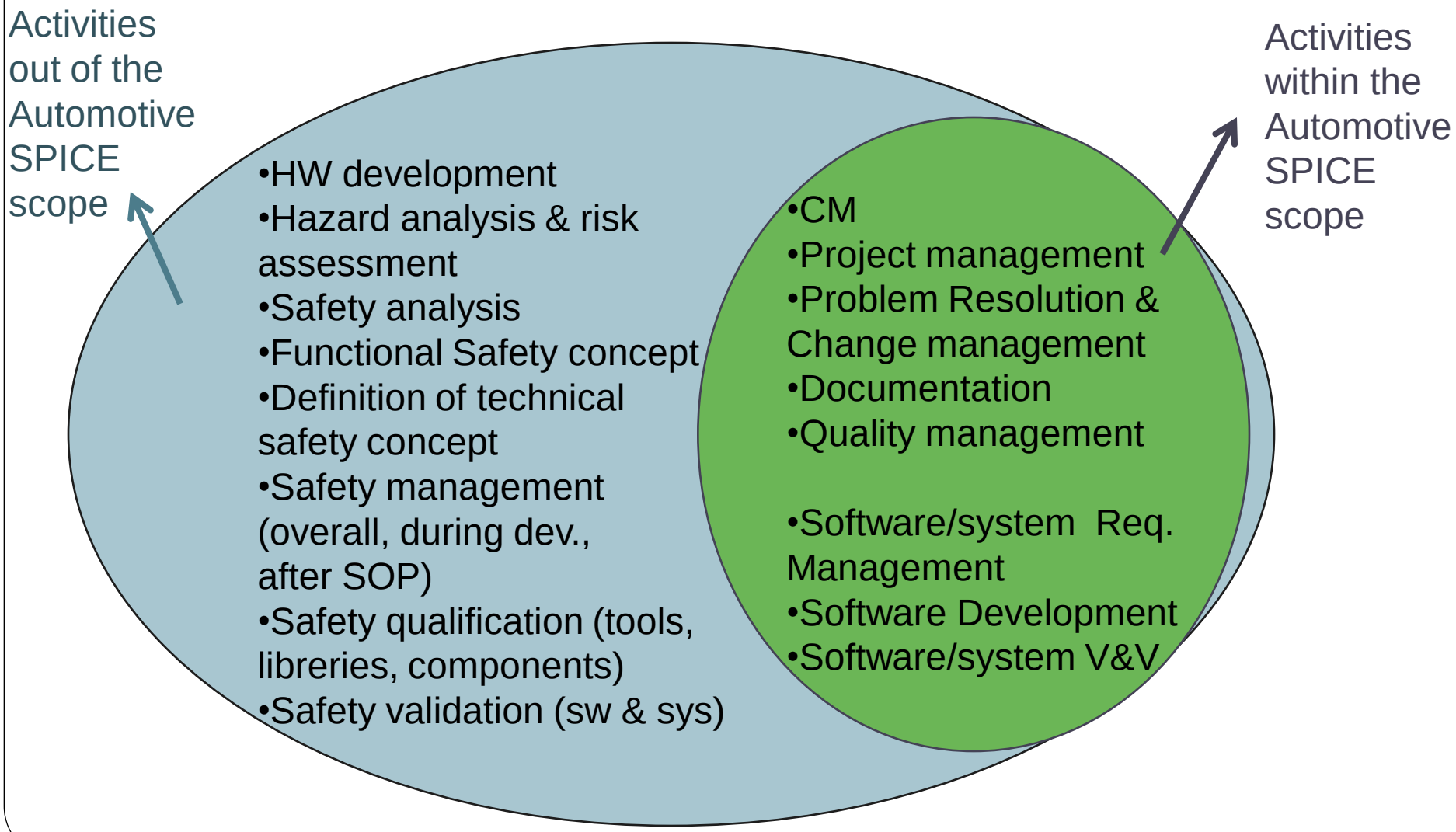
ISO 26262


1. Glossary
2. Management of functional safety
2-4 Overall project independent safety management
2-5 Project-dependent safety management during development
2-6 Safety management after product release
3. Concept phase
3-4 Item definition
3-5 Initiation of the safety lifecycle
3-6 Hazard analysis and risk assessment
3-7 Functional safety concept
4. Product development: system level
4-4 Initiation of product development at the system level
4-5 Specification of technical safety concept
4-6 System design
4-7 Item integration and testing
4-8 Safety validation
4-9 Functional safety assessment
4-10 Product release
5. Product development: hardware level
5-4 Initiation of product development at the hardware level
5-5 Specification of hardware safety requirements
5-6 Hardware design
5-7 Hardware architectural constraints
5-8 Assessment criteria for probability of violation of safety goals
5-9 Hardware integration and testing
5-10 Safety requirements for hardware software interface
6. Product development: software level
6-4 Initiation of product development at the software level
6-5 Specification of software safety requirements
6-6 Software architectural design
6-7 Software unit design and implementation
6-8 Software unit testing
6-9 Software integration and testing
6-10 Software safety acceptance testing
7. Production and operation
7-4 Production
7-5 Operation, service and decommissioning
Core processes
8. Supporting processes
8-4 Interfaces within distributed developments
8-5 Overall management of safety requirements
8-6 Configuration management
8-7 Change management
8-8 Verification
8-9 Documentation
8-10 Qualification of software tools
8-11 Qualification of software components
Qualification of hardware components
9. ASIL-oriented and safety-oriented analyses
9-4 ASIL decomposition
9-5 Criticality analysis
9-6 Analysis of dependent failures
9-7 Safety analyses
Safety lifecycle

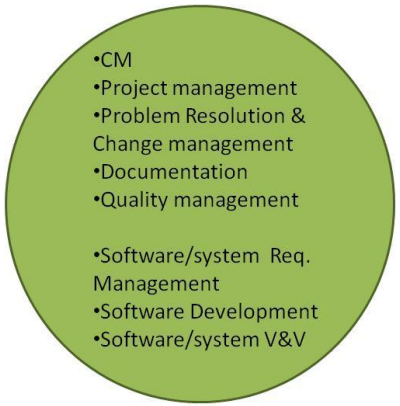
How does Automotive SPICE support the Safety Lifecycle?

- The support provided by Automotive SPICE to the ISO 26262 Safety Lifecycle is related to:
  - Project Management
  - CM
  - QM
  - ENG.*
  - Product release
  - Documentation
- From a producer point of view the goal is to understand the overlapping between.
  With a synergical perspective.

Overlapping between Automotive SPICE processes & ISO 262626 requirements



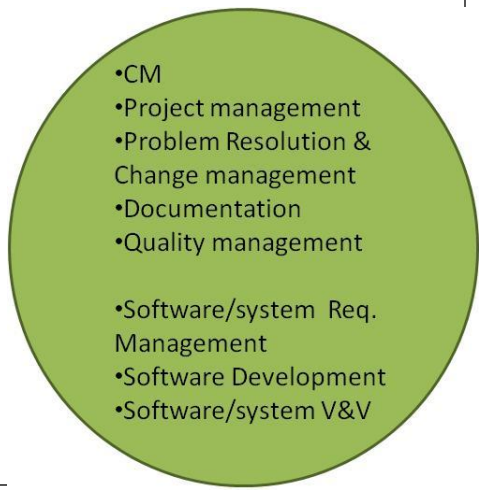
- It has been argued that having the Automotive SPICE processes (HIS scope, as a minimum) at level 2 provides support for the fulfillemnt of the ISO 26262 requirements
(see the *intersection area*).
[see E. Petry presentation @ 6W]



ISO 26262 ? Automotive SPICE

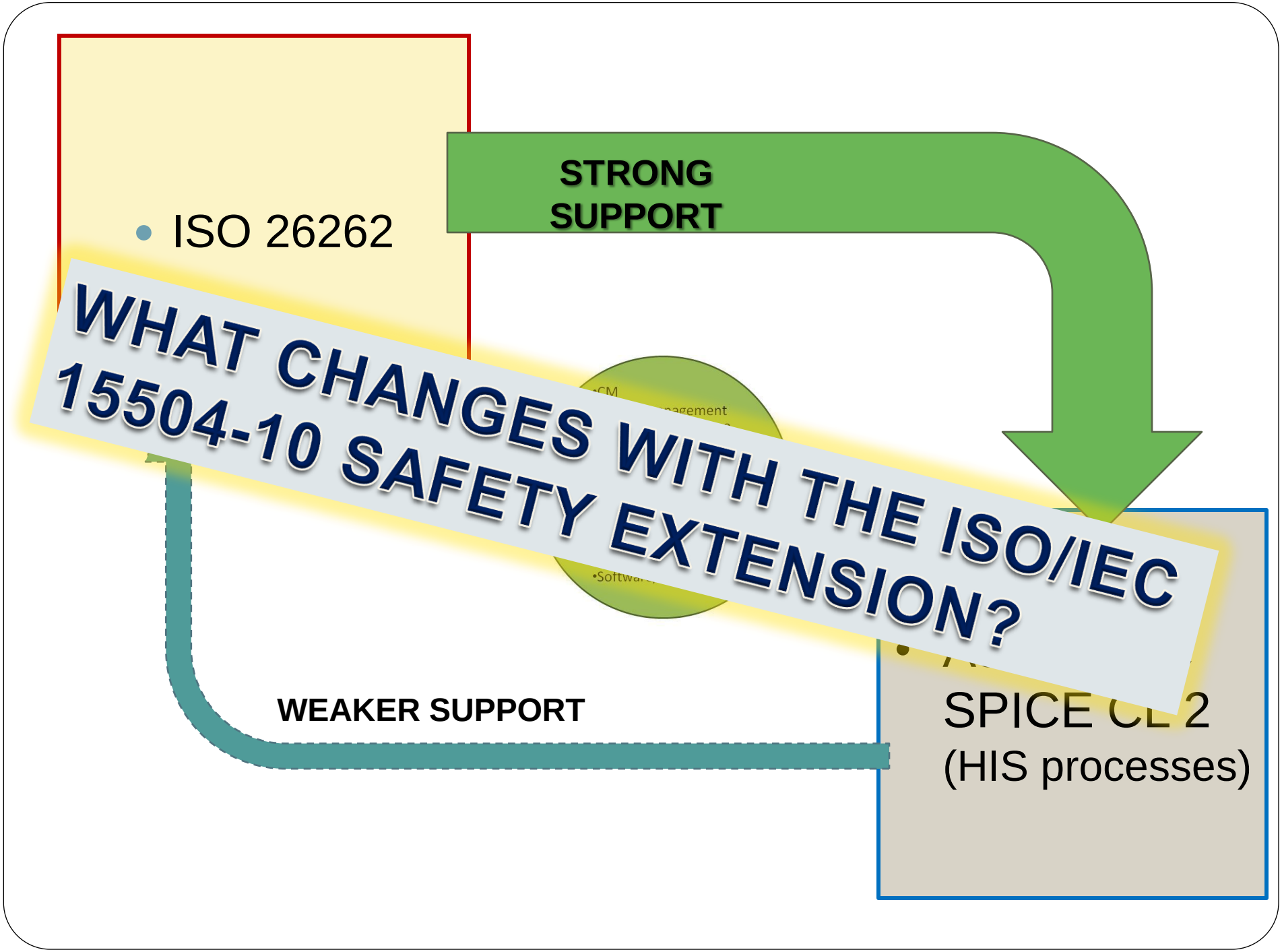
Scenario 1: ISO 26262 compliance

- Having achieved the ISO 26262 compliance for a certain project allow to infer the perfomance (and management) of processes (CM; PM; Problem resolution and change Man.; Documentation; QM; Requirements Man., Sw/System development, V&V) => achievement of Automotive SPICE capability level 1/2.
- It doesn't provides any guarantee of level 3 for processes



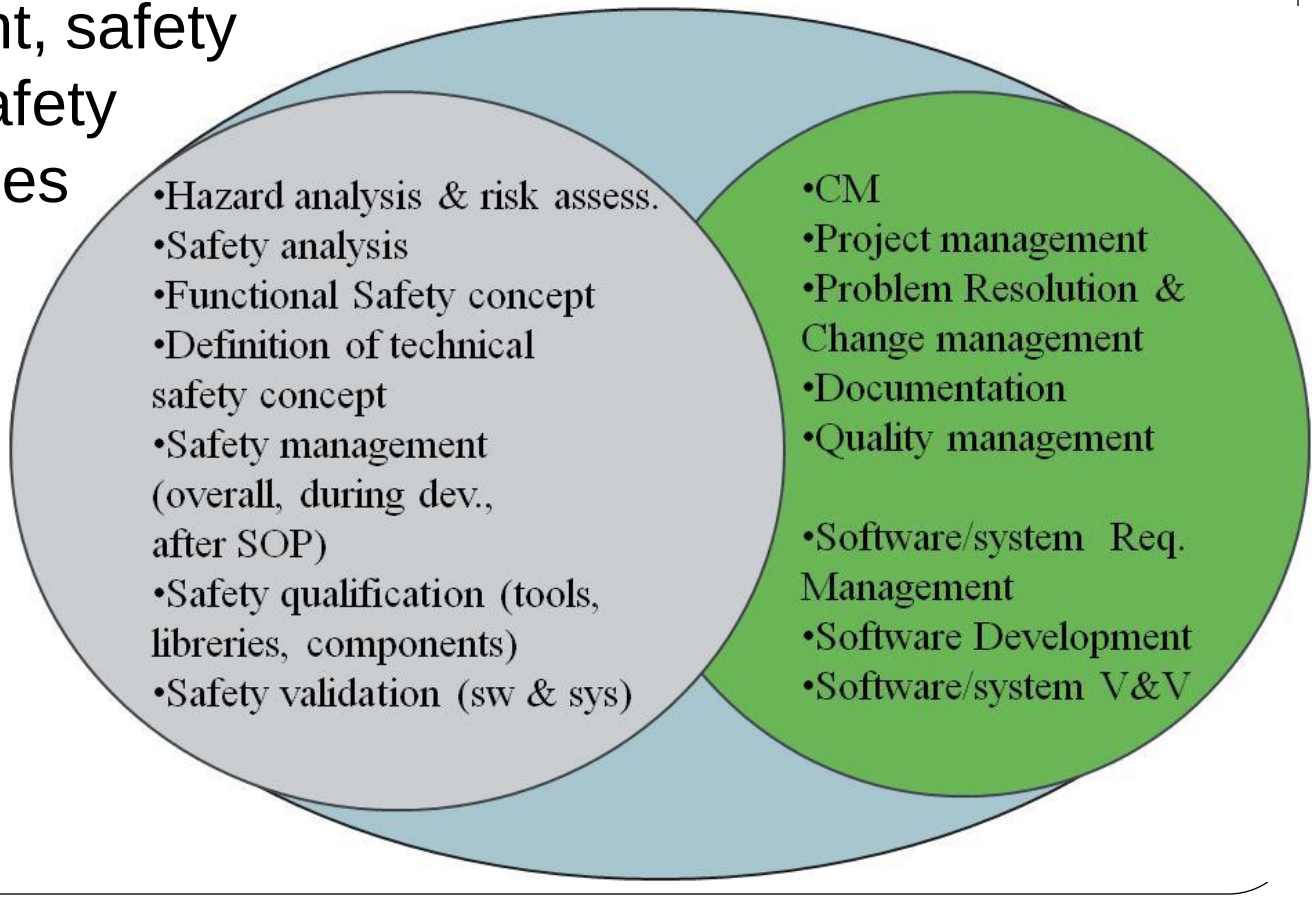
Scenario 2: Automotive SPICE (HIS processes) level 2

- It supports the achievement of compliance of ISO 26262 requirements for
  - CM; PM; Problem resolution and change Man.; Documentation; QM; Requirements Man.
  - Uncertain support for SW/Sys development and V&V. (because the ***way*** processes are performed may be different from the ***way*** required by the ISO 26262)
- It doesn't provide any guarantee for ISO 26262 compliance


ISO 26262
STRONG SUPPORT
WHAT CHANGES WITH THE ISO/IEC 15504-10 SAFETY EXTENSION?
WEAKER SUPPORT
SPICE CL 2
(HIS processes)

ISO 26262 vs. ISO/IEC 15504-10

- The goal of ISO 26262 (61508) is to demonstrate the capability to develop certain products with acceptable risks
- To do that the organization is required to perform defined safety management, safety engineering and safety qualification activities
- These activities correspond to the processes belonging to the ISO/IEC 15504-10 Safety Extension



ISO/IEC 15504-10 Safety Extension

Safety Management process (SAF.1): The purpose is to ensure that products, services and life cycle processes meet safety objectives

Process outcomes:

- Safety principles and safety criteria are established.
- The scope of the safety activities for the project is defined.
- Safety activities are planned and implemented.
- Tasks and resources necessary to complete the safety activities are sized and estimated.
- Safety organization structure (responsibilities, roles, reporting channels, interfaces with other projects or OUs …) is established.
- Safety activities are monitored, safety-related incidents are reported, analysed, and resolved.
- Agreement on safety policy and requirements for supplied products or services is achieved.
- Supplier's safety activities are monitored.

Base Practices:

- SAF.1.BP.1: Define safety objectives and criteria.
- SAF.1.BP.2: Define Safety Life Cycle.
- SAF.1.BP.3: Perform safety planning.
- SAF.1.BP.4: Define safety activities integration.
- SAF.1.BP.5: Define skills requirements definition and allocate responsibility.
  SAF.1.BP.6: Implement planned safety activities.
- SAF.1.BP.7: Monitor the deployment of the safety activities.
- SAF.1.BP.8: Define and agree safety policy and safety requirements with suppliers.
- SAF.1.BP.9: Monitor the safety activities of the supplier.
- SAF.1.BP.10: Implement an escalation mechanism.

ISO/IEC 15504-10 Safety Extension

Safety Engineering process (SAF.2): the purpose is to ensure that safety is adequately addressed throughout all stages of the engineering processes.

Process outcomes:

- Hazards related to product are identified and analysed.
- Hazard log is established and maintained.
- Safety demonstration for the product lifecycle is established and maintained.
- Safety requirements are defined.
- Safety integrity requirements are defined and allocated.
- Safety principles are applied to development processes.
- Impacts on safety of change requests are analysed.
- Product is validated against safety requirements.
- Independent evaluations are performed.

Base Practices:

- SAF.2.BP.1: Identify hazard sources and hazards.
- SAF.2.BP.2: Analyze hazards and risks.
- SAF.2.BP.3: Establish and maintain hazard log.
- SAF.2.BP.4: Establish and maintain safety demonstration.
- SAF.2.BP.5: Establish and maintain safety req.s.
- SAF.2.BP.6: Determine safety integrity requirements.
  NOTE : Safety integrity req. may be described i.e. as SIL.
- SAF.2.BP.7: Allocate safety requirements and safety integrity requirements.
- SAF.2.BP.8: Apply safety principles to achieve safety integrity requirements.
- SAF.2.BP.9: Perform safety impact analysis on changes.
- SAF.2.BP.10: Perform safety validations on product.
- SAF.2.BP.11: Perform independent assessments.

ISO/IEC 15504-10 Safety Extension

Safety Qualification process (SAF.3): the purpose is to assess the suitability of external resources when developing a safety-related software or system.

Process outcomes:

- Safety qualification strategy for external resources is developed.
- Safety qualification plan is developed and executed.
- Safety qualification documentation is written.
- Safety qualification report is produced.

Base Practices:

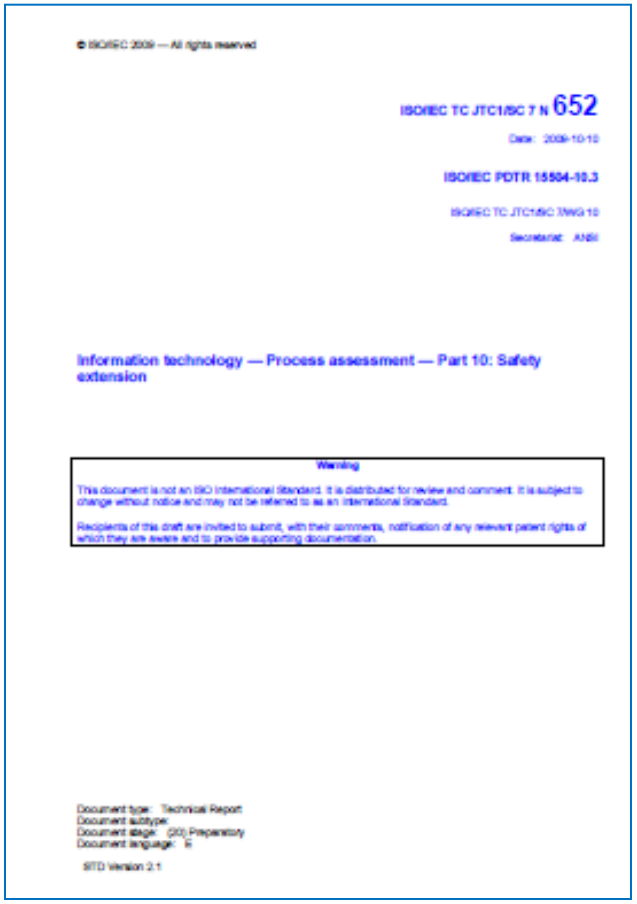
- SAF.3.BP.1: Develop a safety qualification strategy.
- SAF.3.BP.2: Plan the safety qualification of external resources.

  NOTE : Examples of external resources are as follows:
  - core engineering tools - automatic code generators, compilers and linkers;
  - engineering support tools - test, build and CM tools;
  - management support tools - documentation and project management tools.
- SAF.3.BP.3: Qualify the external resources.
- SAF.3.BP.4: Record the safety qualification results.
- SAF.3.BP.5: Maintain and update the safety qualification results.

ISO/IEC 15504-10
Realtionship among processes

ISO/IEC 15504-10 clause 5: Lifecycle Guidance

- It gives the assessors, for each process contained in 15504-5 and 15504-6, an indication of additional issues to be taken into account at assessment time.
- In Annex A WP characteristics are provided



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Information technology — Process assessment — Part 10: Safety extension

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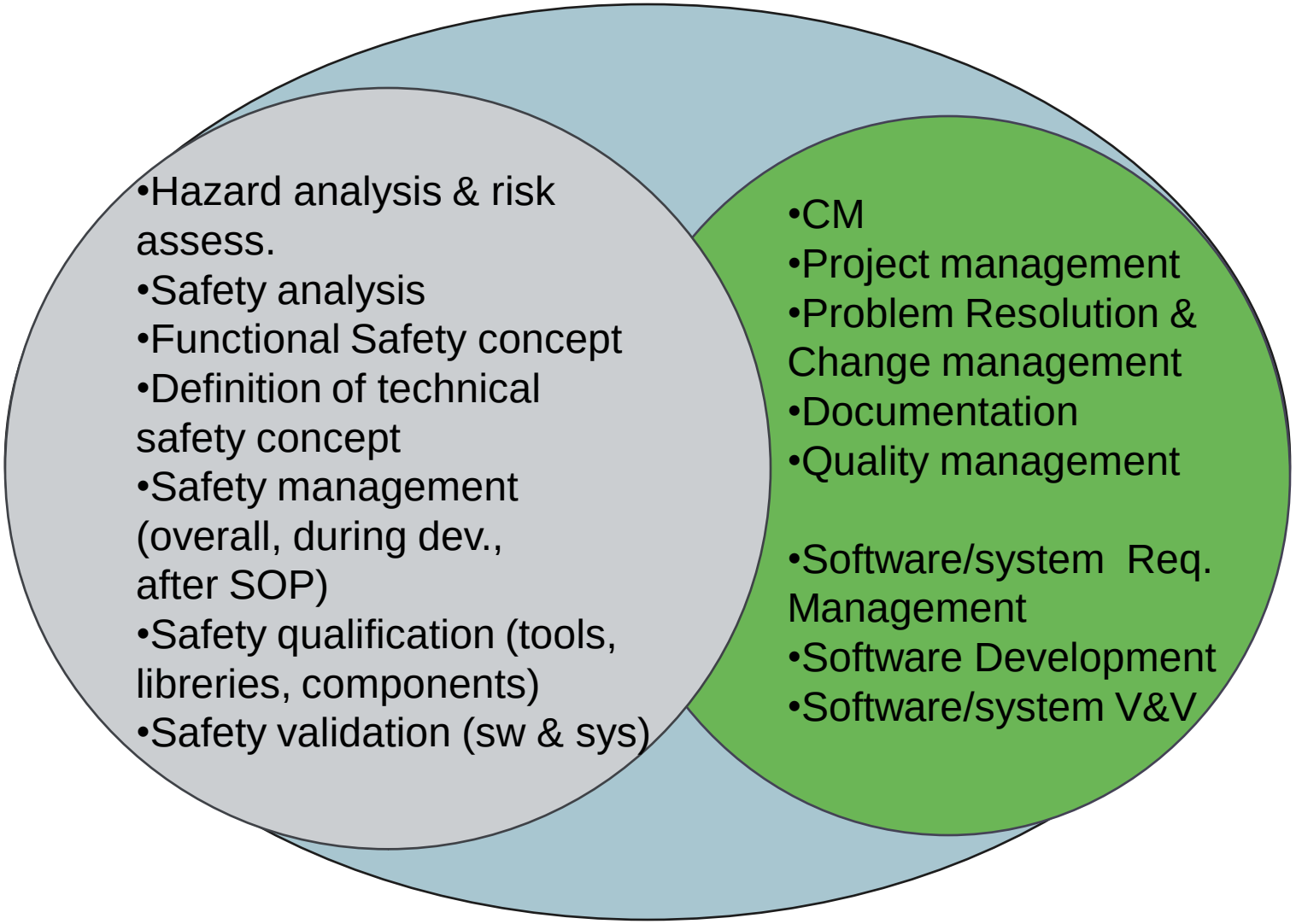
ISO 26262 vs. ISO/IEC 15504-10



Realtionship between ISO 26262 & ISO/IEC 15504-10

Scenario 1: ISO 26262 compliance

- It is possible to infer the perfomance (and management) of processes into the HIS scope + those belonging to the ISO/IEC 15540-10 ⇨ achievement of Automotive SPICE (HIS) CL1/2 + CL 1/2 of the ISO/IEC 15504-10 processes.

Why should I spend effort for increasing the capability of ISO/IEC 15504-10 processes?

Scenario 2: Automotive SPICE (HIS)+ ISO/IEC 15504-10 (CL 2)

- It supports the achievement of compliance of ISO 26262 requirements for:
  - all the activties but
  - SW/Sys development and V&V. activities (because the ***way*** process are prerformed may be different from the ***way*** required by the ISO 26262)
- It doesn't provide any guarantee for ISO 26262 compliance

Why increasing ISO/IEC 15504-10 processes capability?

- Capability is not (only) performance
- Higher capability means:
  - Efficient and repeatable development
  - Lower risk of missing project objectives
  - Identification of improvement areas
- Improving the capability of 15504-10 processes:
  - Isn’t a short cut for ISO 26262 but
  - It is a way to improve safety-related processes
  - Is a managerial choice oreinted to process improvement
  - Is a way to extend the benefits of ten years of process improvement in automtive to safety-related activities

Thanks

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ISO/IEC 15504 & Automotive SPICE Principal Assessor

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